ABSORPTION SPECTROSCOPY IN THE 4.4-4.6 μm INFRARED WAVELENGTH RANGE FOR THE 10 KHZ HIGH-SPEED MEASUREMENT OF CO AND CO_2 CONCENTRATIONS IN COMBUSTING ENVIRONMENTS.

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An instrument has been developed to make 10 kHz *in situ* combustion gas measurements of carbon monoxide (CO) and carbon dioxide (CO_2) concentrations. Operating in both the 4.40 and 4.58 μm wavelength ranges allows for the fundamental molecular absorption bands of both molecules to be utilized.

Such concentration measurements allow for the determination of total combustion efficiency of a particular process, which has engineering implications when considering the energy available from a combustion process to be utilized for propulsion purposes.

A brief discussion of the initial calibration of the sensor with a calibrated diffusion flame, Hencken burner, and pressure-concentration cell is made with the main focus of the current work being the application of the instrument to examine the structure of propagating detonation waves.